

## Unit 5 - Trigonometry

### L1(7.1) Congruent & Similar Triangles

Definitions:

1. Ratio - a relationship between two quantities, usually expressed as a fraction.
2. Proportional - all ratios between corresponding sides are equal between two objects, and the ratio is called the scale factor.
3. Congruent - two objects are congruent if they have the same dimensions and shape (the scale factor is 1)

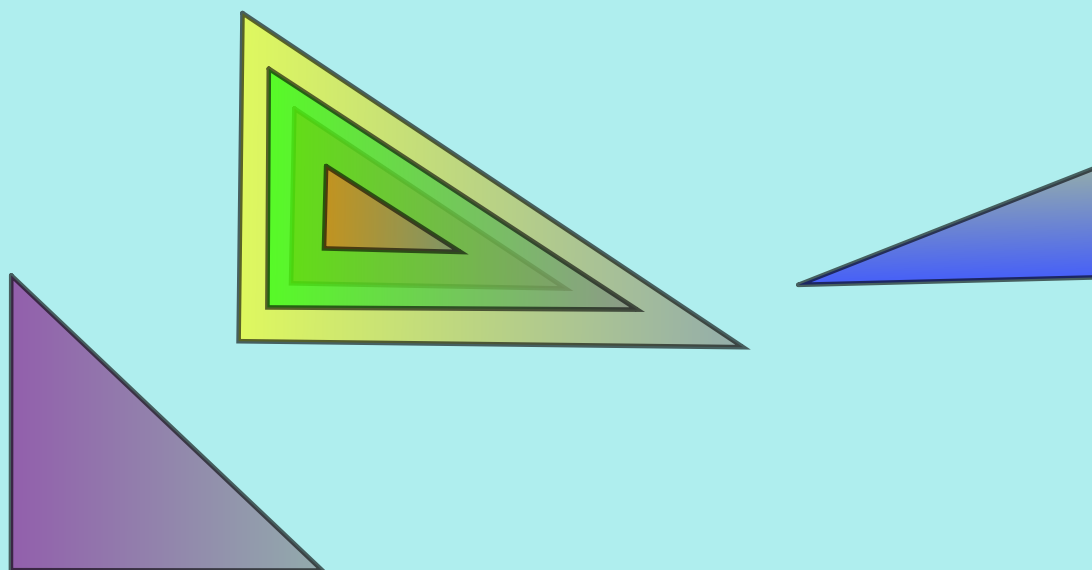
Proven if : SSS, SAS (angle contained) or ASA (side contained)

4. Similar - objects are proportional, but not congruent (the scale factor is not 1)

Proven if: SSS~ , SAS~ or AA~

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Which shapes are congruent? proportional?

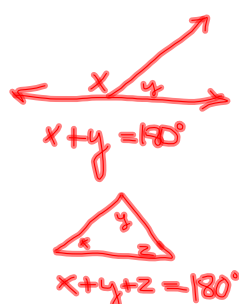
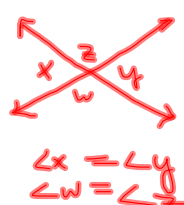
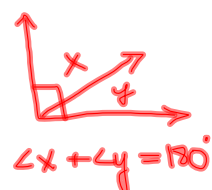


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## Parallel Line Theorems

Z pattern	F pattern	C pattern
Alternate angles are equal	Corresponding angles are equal	Co-interior angles add to 180°

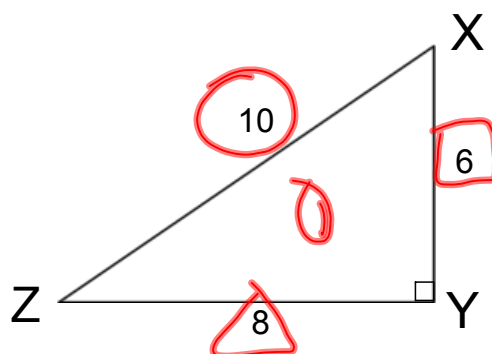
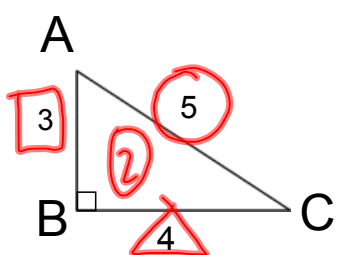
Remember.... SAT or OAT or CAT

Supplementary Angle TheoremOpposite Angle TheoremComplementary Angle Theorem

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Ex.1 Are the triangles congruent? Similar? Neither?

(a)

Ratio

$$\frac{5}{10} = \frac{1}{2} \quad \text{or} \quad \frac{10}{5} = 2$$

$$\frac{3}{6} = \frac{1}{2} \quad \text{or} \quad \frac{6}{3} = 2$$

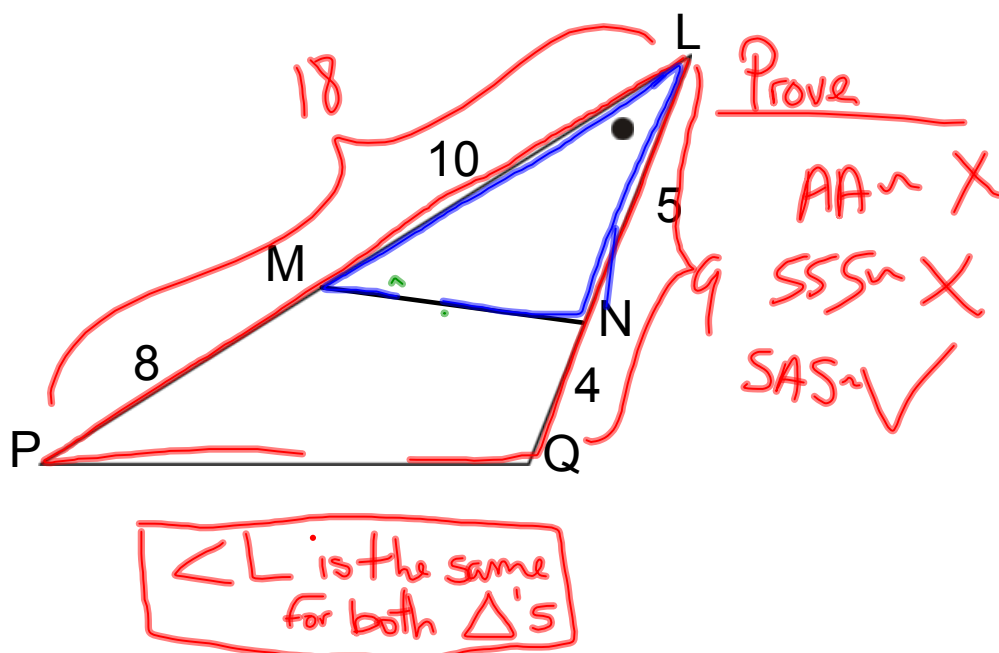
$$\frac{4}{8} = \frac{1}{2} \quad \text{or} \quad \frac{8}{4} = 2$$

triangle ① is 2 times bigger than ②

$\therefore$  the triangles are similar

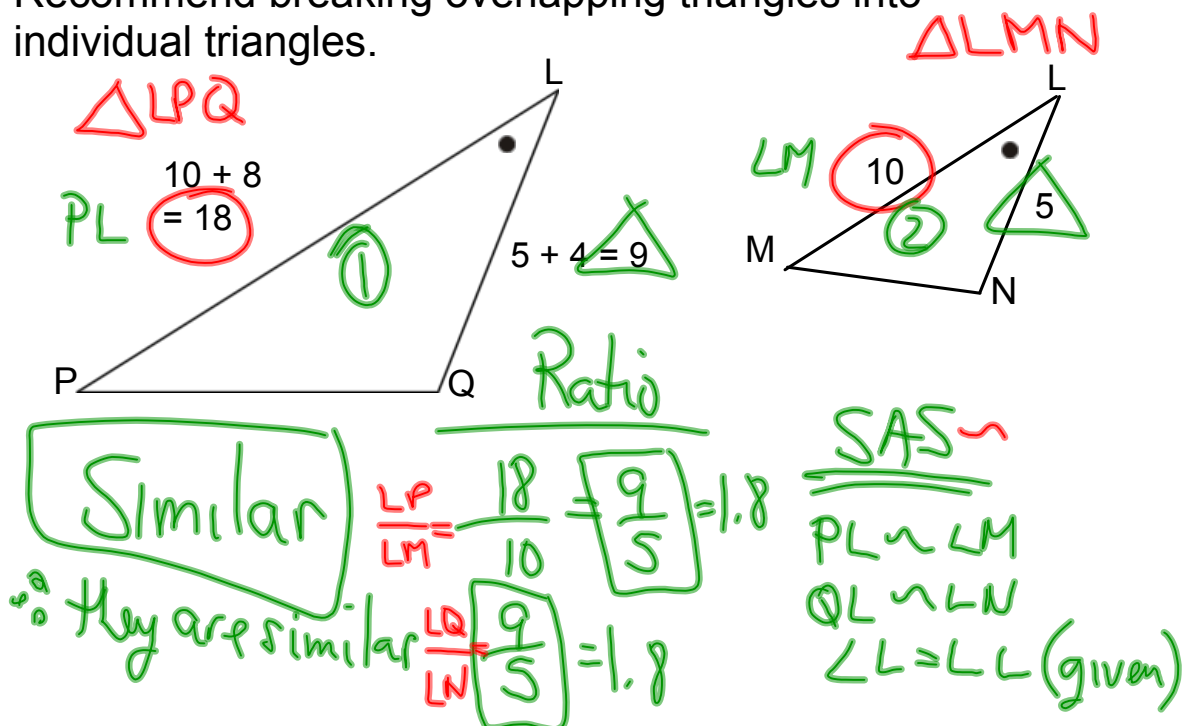
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(b)



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Recommend breaking overlapping triangles into individual triangles.



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(c)

~~SSS~~  
~~SAS~~  
AA~

Recall:

- all angles in a triangle add up to  $180^\circ$ .
- angle X has to be the same.

prove

$\angle B = \angle E$   
(given  $90^\circ$ )

$\angle DCE = \angle ACB$   
(given)

$\therefore$  they are similar because of AA~

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## Summary:

If  $\triangle ABC$  is similar to  $\triangle XYZ$ ,  
we write:

$\triangle ABC \sim \triangle XYZ$   
 similar

\* the order that we  
write the vertices  
is important

We can show similarity (or congruence) by:

- (a) side-side-side similarity (SSS~)  
(b) side-angle-side similarity (SAS~)  
(c) angle-angle similarity (AA~)

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In similar triangles

- corresponding sides are proportional  
(i.e., the ratios are equal)
- corresponding angles are equal.

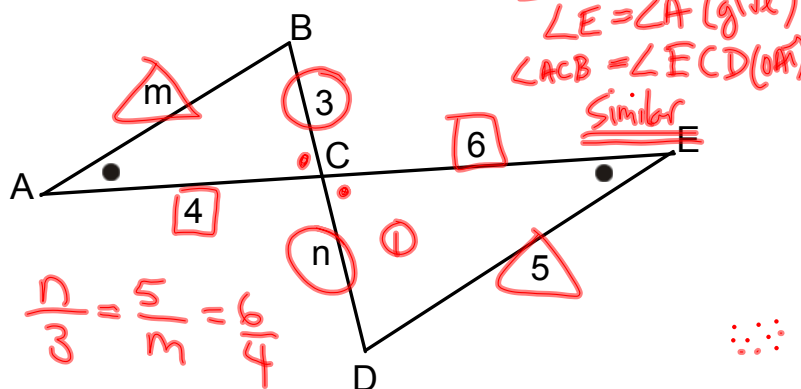
Given  $\triangle ABC \sim \triangle XYZ$

Sides:  $\frac{AB}{XY} = \frac{BC}{YZ} = \frac{AC}{XZ}$

Angles:  $\angle A = \angle X$   
 $\angle B = \angle Y$   
 $\angle C = \angle Z$

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Ex.2 Determine the value of m & n.



$$\frac{n}{3} = \frac{5}{n} = \frac{6}{4}$$

$$3 \cdot \frac{n}{3} = \frac{6}{4} \cdot 3$$

$$n = \frac{18}{4}$$

$$n = 4.5$$

$$\frac{4.5}{3} = \frac{5}{3.3} = \frac{6}{4}$$

$$\frac{5}{n} = \frac{6}{4}$$

$$5 \cdot \frac{m}{5} = \frac{4}{6} \cdot 5$$

$$m = \frac{20}{6}$$

$$m = 3.3$$

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Assigned Work:

Read p.374 - 378

Answer p.378 # 1, 2, 4ac, 5, 6, 7ab, 8cd, 13

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